DEPARTMENT OF THE INTERIOR
FRANKLIN K. LANE, Secretary

UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, Director

THE PRODUCTION OF LEAD IN THE UNITED STATES IN 1916

BY

C. E. SIEBENTHAL

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Production of primary refined lead[a] in the United States
Primary refined lead available for consumption in the Unit
Value[b] of primary refined lead smelted or refined in the Unit

PRIMARY LEAD SMELTED OR REFINED IN THE UNITED STATES.

[Apportioned according to source of ore.]

	1910	1911	1912	1913	1914	1915	1916
DOMESTIC ORE:							
Alaska	75	51	45	6	....	358	659
Arizona	948	3, 428	3, 891	4, 901	5, 601	6, 953	15, 328
Arkansas	....	15	....	....	52	51	170
California	1, 207	615	811	3, 294	3, 698	5, 606	3, 633
Colorado	38, 542	30, 442	37, 039	42, 840	41, 198	32, 352	33, 046
Georgia	....	....	....	....	....	....	9
Idaho	109, 951	117, 335	127, 780	137, 802	177, 827	160, 680	170, 059
Illinois	263	308	513	619	427	910	670
Iowa	....	....	....	....	34	....	....
Kansas	1, 308	2, 522	1, 937	1, 504	1, 043	1, 320	1, 737
Kentucky	50	....	91	16	16	95	37
Missouri	161, 659	182, 203	162, 610	152, 430	194, 275	195, 634	218, 253
Montana	1, 943	2, 484	2, 517	3, 256	4, 386	4, 853	4, 961
Nevada	2, 246	1, 082	5, 699	6, 142	5, 996	7, 664	11, 858
New Hampshire	....	....	....	....	....	3	46
New Mexico	1, 890	1, 371	2, 511	1, 821	741	2, 157	3, 290
North Carolina	2	35	34	10	....	....	....
Oklahoma	1, 805	1, 925	2, 500	3, 214	3, 916	4, 346	10, 969
Oregon	....	11	21	37	17	11	9
Pennsylvania	....	....	....	....	....	6	....
South Carolina	....	....	....	....	....	....	8
South Dakota	8	33	12	7	2	5	12
Tennessee	....	....	....	....	....	8	....
Texas	36	57	30	108	89	111	26
Utah	60, 605	54, 933	60, 664	71, 069	88, 976	106, 105	111, 789
Virginia	87	400	85	878	143	457	740
Washington	339	612	53	9	2	11	[c] 217
Wisconsin	3, 909	3, 966	3, 301	2, 639	1, 819	2, 632	3, 121
Wyoming	....	....	....	....	....	6	....
Undistributed	101	48	120	63	99	116	96
Zinc residues	2, 237	1, 987	3, 131	3, 765	4, 125	4, 562	5, 478
Total from domestic ore	389, 211	405, 863	415, 395	436, 430	534, 482	537, 012	596, 221
FOREIGN ORE:							
Africa	3, 310	582	1, 774	5, 976	2, 942	....	328
Canada	25	122	29	16	2	1, 174	1, 231
Central America	3	28	....	....	....	1	7
Mexico	11, 704	7, 333	7, 407	4, 512	2, 386	5, 437	1, 917
South America	2, 996	2, 677	2, 332	2, 617	1, 821	2, 829	2, 366
Other foreign	27	22	30	102	488	140	236
FOREIGN BASE BULLION:							
Canada	....	....	....	....	....	....	1, 072
Mexico	76, 805	84, 220	76, 805	37, 359	21, 689	33, 173	11, 598
South America	....	....	....	....	....	275	151
Total from foreign ore and base bullion	94, 870	94, 984	88, 377	50, 582	29, 328	43, 029	18, 906
Grand total from all sources	484, 081	500, 847	503, 772	487, 012	563, 810	580, 041	615, 127

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[a] Primary lead is that smelted from ore.
[b] The value is calculated upon the annual average of the daily open market quotation for spot lead at New York City.
[c] In addition 2,001 tons of lead was smelted in Canada from ores from Washington.

E INTERIOR

Secretary

GICAL SURVEY

Director

F LEAD IN 1916

ounds)

THAL

	1915	1916	Increase in 1916. Quantity.	Increase in 1916. Percentage.
	550,055	571,134	21,079	3.8
	426,364	477,384	51,020	12.0
	$51,705,000	$78,816,000	$27,111,000	52.3

PRODUCTION OF REFINED PRIMARY LEAD IN THE UNITED STATES.

	1910	1911	1912	1913	1914	1915	1916
Domestic desilverized lead	206, 132	200, 381	221, 480	250, 578	311, 069	301, 564	316, 469
Domestic soft lead	141, 318	155, 947	141, 248	131, 867	158, 219	161, 461	165, 015
Domestic desilverized soft lead	27, 952	35, 667	29, 789	29, 433	43, 506	44, 001	70. 744
Foreign desilverized lead	94, 870	94, 984	88, 377	50, 582	29, 328	43, 029	18, 906
Total production of refined primary lead	470, 272	486, 979	480, 894	462, 460	542, 122	550, 055	571, 134
Production of antimonial lead	14, 069	14, 078	13, 552	14, 665	16, 667	23, 224	24, 038

REFINED PRIMARY LEAD AVAILABLE FOR CONSUMPTION IN THE UNITED STATES.[a]

	1910	1911	1912	1913	1914	1915	1916
Supply:							
Stock in bonded warehouses Jan. 1	17, 405	35, 972	4, 481	10, 492	5, 310	7, 668	12, 169
Imports—							
For consumption	15, 359	13, 281	14, 146	11, 980	7, 386	9, 680	12, 771
For warehouse	93, 249	76, 671	69, 414	45, 165	20, 952	41, 816	22, 559
Increase by liquidation	....	....	....	....	....	2, 250	5, 642
Production from domestic ores	375, 402	391, 995	392, 517	411, 878	512, 794	507, 026	552, 228
Total supply	501, 415	517, 919	480, 558	479, 515	546, 442	568, 440	605, 369
Withdrawn:							
Exports of foreign lead—							
From warehouse	69, 786	101, 227	64, 906	44, 544	21, 545	38, 618	9, 880
In manufactures, with benefit of drawback	8, 800	12, 080	11, 320	9, 757	9, 399	3, 983	5, 171
Exports of domestic lead	....	....	....	....	58, 722	87, 306	100, 565
Decrease by liquidation	7, 661	14, 812	5, 692	419	56	....	....
Stock in bonded warehouses Dec. 31	35, 972	4, 481	10, 492	5, 310	7, 668	12, 169	12, 369
Total withdrawn	122, 219	132, 600	92, 410	60, 030	97, 390	142, 076	127, 985
Available for consumption	379, 196	385, 319	388, 148	419, 485	449, 052	426, 364	477, 384

PRODUCTION OF SECONDARY LEAD IN THE UNITED STATES.[b]

	1910	1911	1912	1913	1914	1915	1916
Pig lead	29, 492	27, 389	30, 266	33, 104	29, 337	36, 400	([c])
Lead in alloys	25, 930	26, 895	36, 902	39, 730	31, 725	42, 500	....
Total recovered lead	55, 422	54, 284	67, 168	72, 834	61, 077	78, 900	....

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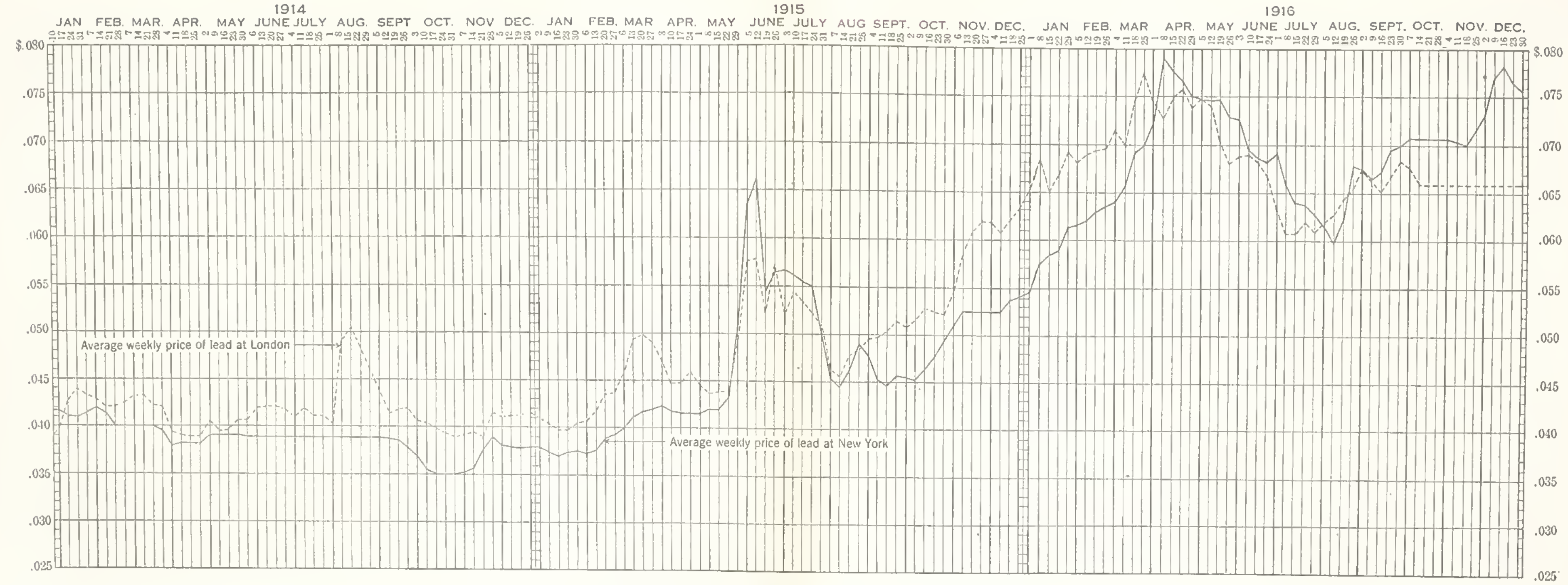
[a] See explanatory note on the last page.

[b] Secondary lead is that obtained by refining skimmings, drosses, old metals, etc.

[c] Statistics not yet complete.



Average weekly price of lead at New York and London, 1914-1916.

ACTIVE LEAD SMELTERS AND REFINERIES IN THE UNITED STATES.

- California: Selby—Selby Smelting & Lead Co.[1] Refinery also.
- Colorado:
  - Denver—Globe plant, American Smelting & Refining Co.
  - Durango—Durango plant, American Smelting & Refining Co.
  - Leadville—Arkansas Valley plant, American Smelting & Refining Co.
  - Pueblo—Pueblo plant, American Smelting & Refining Co.
  - Salida—The Ohio & Colorado Smelting & Refining Co.
- Idaho: Kellogg—Bunker Hill & Sullivan Smelter.
- Illinois:
  - Aurora—Aurora Metal Co.[2]
  - Chicago—Goldsmith Bros.' Smelting & Refining Co.[2]
  - Chicago—Great Western Smelting & Refining Co.[2]
  - Collinsville—St. Louis Smelting & Refining Co.[3] Refinery only.
  - Federal—Federal Lead Co.[1]
- Indiana:
  - East Chicago—International Lead Refining Co.[4] Refinery only.
  - Grasselli—United States Metals Refining Co.[5] Refinery only. Betts electrolytic process.
- Kansas: Galena—Galena Smelting & Manufacturing Co.[6]
- Missouri:
  - Desloge—Desloge Consolidated Lead Co.
  - Granby—Granby Mining & Smelting Co.
  - Herculaneum—St. Joseph Lead Co.
  - Joplin—Eagle-Picher Lead Co.
  - Webb City—Webb City Smelting & Manufacturing Co.[6]
- Montana: East Helena—East Helena plant, American Smelting & Refining Co.
- Nebraska: Omaha—Omaha & Grant Smelting Co.[7] Refinery only. Betts electrolytic process.
- New Jersey:
  - Newark—Balbach Smelting & Refining Co. Refinery also.
  - Perth Amboy—Perth Amboy plant, American Smelting & Refining Co. Refinery also.
- Pennsylvania: Carnegie—Pennsylvania Smelting Co. Refinery also.

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[1] Subsidiary of American Smelters Securities Co.
[2] Smelters of secondary materials but treating some lead ores.
[3] Subsidiary of National Lead Co.
[4] Subsidiary of Anaconda Copper Mining Co.
[5] Subsidiary of United States Smelting, Refining & Mining Co.
[6] Subsidiary of Eagle-Picher Lead Co.
[7] Subsidiary of American Smelting & Refining Co.

- Texas: El Paso—Kansas City Consolidated Smelting & Refining Co.[1]
- Utah:
  - Midvale—United States Smelting Co.[2]
  - Murray—Murray plant, American Smelting & Refining Co.
  - International—International Smelting Co.[3]
- Washington: Northport—Northport Smelting & Refining Co.

LEAD SMELTERS AND REFINERIES IN CANADA IN 1916.

- British Columbia: Trail—Consolidated Mining & Smelting Co. of Canada (Ltd.). Refinery also. Betts electrolytic process.
- Ontario: Kingston—North American Smelting Co. (Ltd.).

LEAD SMELTERS AND REFINERIES IN MEXICO IN 1916.

- Aguascalientes: Aguascalientes—American Smelting & Refining Co.
- Chihuahua:
  - Chihuahua—American Smelting & Refining Co.
  - Uruachic—Uruáchic Mining & Smelting Co. (Ltd.).
- Coahuila:
  - Saltillo—Mazapil Copper Co. (Ltd.).
  - Torreon—Compañía Metalúrgica de Torreón.
- Durango:
  - Asarco (Velardena)—American Smelters Securities Co.
  - Mapimi—Compañía Minera de Penoles.[4]
- Guerrero: Campo Morado—Reforma Mining & Milling Co.
- Nuevo Leon: Monterey—American Smelting & Refining Co.
- San Luis Potosi:
  - Matehuala—American Smelters Securities Co. (National Metallurgical Co.)
  - San Luis Potosi—Compañía Metalúrgica Mexicana.
- Sonora:
  - Guaymas—Pacific Smelting & Refining Co. (Mexican-American Smelting & Refining Co. (Ltd.).)
  - Ures—Yaqui Smelting & Refining Co., S. A. Refinery also.
- Zacatecas: Chalchihuites—National Smelting Co.

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[1] Subsidiary of American Smelting & Refining Co.
[2] Subsidiary of United States Smelting, Refining & Mining Co.
[3] Subsidiary of Anaconda Copper Mining Co.
[4] Subsidiary of American Metal Co.

IMPORTS.

Lead imported into the United States in ore, base bullion, and refined, by countries, 1910–1916, in pounds.

Country.	1910	1911	1912	1913	1914	1915	1916
United Kingdom	1, 874, 750	401, 686	279, 546	404, 594	245, 548	185, 236	261, 406
Germany	421, 377	56, 286	494, 237	262, 132	4, 529, 919	....	....
Other European countries	418, 669	111, 189	55, 356	143. 293	123, 085	32, 537	314, 353
Total from Europe	2, 714, 796	569, 161	829, 139	810, 019	4, 898, 552	217, 773	575, 759
British North America	206, 979	270, 947	319, 497	338, 569	384, 007	2, 303, 170	12, 606, 216
Mexico	203, 290, 307	172, 633, 479	159, 455, 664	95, 693, 439	46, 282, 207	94, 247, 384	48, 395, 670
South America	6, 598, 263	4, 778, 221	3, 207, 936	8, 766, 327	2, 417, 744	5, 420, 567	6, 235, 758
Other countries	4, 394, 421	1, 651, 544	3, 309, 356	8, 685, 612	2, 694, 293	802, 516	2, 845, 949
Total imports	217, 204, 766	179, 903, 352	167. 121, 592	114, 293, 966	56, 676, 803	102, 991. 410	70, 659, 352

Lead imported into the United States, by classes, 1910–1916, in pounds.

Year.	Lead in ore (lead content).	Base bullion.		Pigs, bars, sheets, and old.	Total lead content.
		Gross weight.	Lead content.		
1910	94, 751. 054	118, 061, 415	115, 483. 542	6, 970, 170	217, 204, 766
1911	35, 686, 180	141, 481, 852	138, 952, 372	5, 264. 800	179, 903, 352
1912	19, 577, 499	152, 420, 624	146, 999, 168	544, 925	167, 121, 592
1913	19, 883, 313	96, 908, 170	94, 327, 654	82, 999	114, 293, 966
1914	23, 649, 637	33, 444, 503	32, 730, 320	296, 846	56, 676, 803
1915	18, 185, 140	86, 247, 995	83, 986, 988	819, 282	102, 991, 410
1916	35, 086, 100	24, 943, 660	24, 262, 435	11, 310, 817	70, 659, 352

EXPORTS.

Lead exported from the United States by six-month periods, 1914–1916, by classes.

Material.	1914				1915				1916			
	January–June.		July–December.		January–June.		July–December.		January–June.		July–December.	
	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.	Quantity (pounds).	Value.
FROM DOMESTIC ORE.												
Lead, pigs or bars	40,323,662	$1,511,800	77,120,238	$2,989,874	115,903,983	$4,936,730	60,708,225	$2,991,788	93,233,404	$6,198,514	107,897,235	$7,309,689
Lead manufactures	....	633,234	....	385,000	....	732,875	....	1,538,022	....	1,116,051	....	1,392,227
FROM FOREIGN ORE.												
Lead, pigs and bars	17,668,875	623,491	25,421,500	913,306	34,435,599	1,041,541	42,800,704	1,696,922	9,487,481	419,065	10,272,605	692,588
Lead manufactures	....	1,810	....	432	....	31	....	40,081	....	516	....	25
Lead used in articles exported with benefit of drawback	7,595,127	a301,500	11,416,486	a431,500	6,040,015	a 262,700	1,926,287	a90,535	9,489,870	a645,311	851,205	a43,732
	....	3,071,835	....	4,720,112	....	6,973,877	....	6,357,348	....	8,379,457	....	9,438,261

a Represents the value of the metal used in making the articles exported with benefit of drawback.

Pig lead exported from the United States, by six-month periods and destination, 1914–1916, in short tons.

Destination.	1914				1915				1916			
	January–June.		July–December.		January–June.		July–December.		January–June.		July–December.	
	Domestic.	Foreign.	Domestic.	Foreign.	Domestic.	Foreign.	Domestic.	Foreign.	Domestic.	Foreign.	Domestic.	Foreign.
Canada	....	28	4,082	....	6,176	58	13,913	4,217	12,634	607	24,461	376
Great Britian	7,153	3,963	16,995	6,270	25,945	10,480	5,247	9,551	5,356	1,905	2,692	372
Netherlands	4,720	1,592	2,019	28	677	739	268	1,768	1,527	305	1,026	306
Belgium	2,101	746	560	....	....	....	....	....	....	....	....	....
France	....	....	....	560	8,585	1,171	687	1,344	337	....	336	174
Italy	....	71	589	....	1,560	2,030	449	561	336	....	....	....
Germany	5,141	1,681	2,241	....	....	....	....	....	....	....	....	....
Russia	448	....	6,263	5,717	7,623	1,741	5,901	2,128	5,648	56	12,312	1,229
Japan	....	....	2,247	....	2,081	....	1,339	560	12,106	645	2,773	1,120
Other countries	599	753	3,564	136	5,305	999	2,550	1,271	8,673	1,226	10,348	1,559
	20,162	8,834	38,560	12,711	57,952	17,218	30,354	21,400	46,617	4,744	53,918	5,136

Lead exported from the United States, by months, 1914–1916, in short tons.

Month.	1914			1915			1916		
	Pigs and bars.		Foreign lead used in articles exported with benefit of drawback.	Pigs and bars.		Foreign lead used in articles exported with benefit of drawback.	Pigs and bars.		Foreign lead used in articles exported with benefit of drawback.
	Domestic.	Foreign.		Domestic.	Foreign.		Domestic.	Foreign.	
January	....	1,363	3,798	6,460	3,072	3,020	7,102	1,236	4,745
February	....	166		3,820	1,778		10,246	1,229	
March	5,838	246		7,023	2,301		8,585	734	
April	5,931	3,663		19,936	5,133		5,869	582	
May	2,045	2,420		15,312	3,021		7,558	641	
June	6,348	976		5,401	1,913		7,167	322	
July	10,894	1,119	5,640	1,408	3,162	963	9,009	1,560	426
August	5,486	....		979	5,233		7,542	548	
September	2,793	923		2,458	3,723		15,633	722	
October	7,829	2,521		7,269	3,284		9,496	776	
November	8,417	5,297		9,886	315		6,402	610	
December	3,141	2,851		8,354	5,683		5,867	921	
	58,722	21,545	9,438	88,306	38,618	3,983	100,565	9,880	5,171

EXPLANATORY NOTE.

The refined lead product can not be apportioned according to source of ore, owing to the fact that lead refiners treat smelted products whose origin may, as in custom refining, be unknown to them, the identity of the ore and thus its original source being preserved only as far as the smelter. Accordingly, the table showing source of lead smelted or refined in the United States is based on smelter figures. It includes "pig lead" reported by all smelters using Mississippi Valley soft lead ores and "lead" produced at all other lead smelters in this country. A part of the product reported from smelters operated in conjunction with refineries is given in terms of refined lead. A like part of the antimonial lead product is thus eliminated from the "lead" produced and appears only in the figures showing the production of antimonial lead.

The statement of the production of refined primary lead embraces all desilverized lead produced at works in this country and the pig lead recovered from Mississippi Valley soft lead ores. The pig lead derived from Mississippi Valley ores and desilverized is shown separately. The antimonial lead reported by refineries is also given. The original source of the ore and bullion affording this refined product is shown in detail in the accompanying table showing "Primary lead smelted or refined in the United States."

In the table showing consumption "lead" includes all kinds—lead in ore, base bullion, pigs, bars, and old. The figures showing domestic production are based on returns from the smelters; all other figures are from the records of the Bureau of Foreign and Domestic Commerce. Increase and decrease by liquidation cover corrections and losses in smelting and refining in bond. Warehouse stocks of bonded lead of foreign origin are given, but it has been found impossible to obtain complete figures of domestic stocks. For this reason the result is given as "lead available for consumption."

This advance statement is designed to afford at the earliest practicable date authentic statistics of the production of lead in the United States in 1916. The figures showing the production are based on confidential reports made by each lead smelting and refining company in operation in the United States during the year. The figures showing the imports and exports are taken from the records of the Bureau of Foreign and Domestic Commerce of the Department of Commerce, and those for 1916, not having been finally checked, are subject to minor revision. The cordial cooperation of each lead-smelting company is acknowledged with keen appreciation.

C. E. Siebenthal.

Washington, D. C., *April 9, 1917.*

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